

REMARKS

The Present Invention

The present invention relates to a polybenzazole article that comprises a polybenzazole and a light-resisting agent.

The Pending Claims

Claims 1-3, 6, and 9-11 are currently pending. Reconsideration of the pending claims is respectfully requested.

Amendments to the Claims

The claims have been amended so as to more particularly point out and distinctly claim the invention. In particular, claim 1 has been amended to recite that the light-resisting agent is at least one member selected from the group consisting of *m*-phenylenediamine, *p*-phenylenediamine, *o*-aminophenol, 2-amino-4-nitrophenol, 2-aminophenol-4-sulfonamide, and 1,8-diaminonaphthalene. This amendment is supported by the specification at, for example, page 6, lines 18-21 and lines 37-38 and Examples 1-9. In addition, claims 9-11 have been added and are supported by the specification at, for example, page 6, lines 18-21 and lines 37-38 and Examples 4 and 5. No new matter has been added by way of these amendments.

Summary of the Office Action

Claims 1-3 and 6 stand rejected under 35 U.S.C. § 103(a) as obvious in view of So et al. (U.S. Patent 5,552,221).

Discussion of the Obviousness Rejection

According to the Examiner, So et al. discloses a polybenzazole article comprising polybenzazole and a naphthol dye. The Examiner concedes that So et al. does not disclose the specific light-resisting agents recited in the pending claims. However, the Examiner alleges that one of ordinary skill in the art would have been motivated to use the claimed light-resisting agents with a reasonable expectation of success since So et al. used naphthol that absorbs light with a wavelength of 300-600 nm.

The Examiner also contends that the Rule 132 declaration submitted with the response to Office Action filed November 7, 2003, was not persuasive because claim 1 recites light-resisting agents beyond those evaluated in the declaration. In addition, the Examiner alleges

that applicants previously argued that, by mixing two kinds of light-resisting agents, the strength retention will be higher. According to the Examiner, this statement implies that if only one claimed light-resisting agent is used, the strength retention will be lower than when two or more light-resisting agents are combined and, thus, likely to have a similar strength retention as a polybenzazole article containing naphthol.

The polybenzazole article comprising a specific light-resisting agent of the present invention is markedly superior in light resistance as compared to the polybenzazole article containing a dye (including naphthol) as described in So et al. To further highlight the surprising and unexpected properties of the claimed polybenzazole articles, applicants submitted two Rule 132 Declarations. In the first Rule 132 declaration, submitted with the response to Office Action on March 24, 2003 (hereinafter "Declaration 1"), polybenzazole articles that contained a light-resisting agent recited in the amended pending claims (e.g., Samples 6-14 of Table 1 of Declaration 1) had a strength retention of 51-85% based on the conditions used for testing. Comparatively, a polybenzazole article that is *not* treated with a light-resisting agent (Sample 1 of Declaration 1) had a strength retention of only 35% based on the conditions used for testing. Also, polybenzazole articles containing light-resisting agents disclosed by So et al., such as Rhodamine B, Acid Fuchin, sodium salt, Acid Black 48, and Acid Blue 40 (e.g., Samples 2-5 of Table 1 of Declaration 1), had a strength retention of only 35-45% based on the conditions used for testing.

In the second Rule 132 declaration, submitted with the response to Office Action on November 7, 2003 (hereinafter "Declaration 2"), polybenzazole articles (Samples 6 and 7 of Table 1 of Declaration 2) containing two light-resisting agents recited in the pending claims showed a strength retention of 34% or 55% based on the conditions used for testing. Comparatively, a polybenzazole article that is *not* treated with a light-resisting agent (Sample 1 of Table 1 of Declaration 2) had a strength retention of only 24% based on the conditions used for testing. Polybenzazole articles containing Rhodamine B, Acid Fuchin, sodium salt, 1-naphthol, or 2-naphthol as a light-resisting agent (Samples 2-5 of Table 1 of Declaration 2) had a strength retention of only 23-28% based on the conditions used for testing.

As is readily apparent from the results reported in both Declarations 1 and 2, comparison of the strength retentions between a polybenzazole article treated with a light-resisting agent disclosed by So et al. and a polybenzazole article *not* treated with a light-resisting agent at all indicates that the addition of the dyes disclosed by So et al. as light-

resisting agents to polybenzazole articles did *not* result in significantly higher strength retention (compare Samples 2-5 v. Sample 1 of Declaration 1 and Samples 2-5 v. Sample 1 of Declaration 2). The polybenzazole articles that contained light-resisting agents disclosed by So et al. had strength retentions that were essentially the same as the untreated sample. Therefore, the dyes described in So et al. are not particularly useful as light-resisting agents of polybenzazole articles. Consequently, contrary to the Examiner's assertion, these data demonstrate that not every dye that absorbs light with a wavelength of 300-600 nm is suitable for the present invention.

Regarding the Examiner's contention that if only one claimed light-resisting agent is used, the strength retention will be lower than when two or more light-resisting agents are combined, the data in Declaration 1 demonstrate that using one claimed light-resisting agent still provides a polybenzazole article with greater strength retention than a polybenzazole article containing a light-resisting agent disclosed by So et al. For example, Samples 6-11 (Table 1 of Declaration 1) contained only one light-resisting agent recited in the amended claims, and the corresponding polybenzazole articles still had much higher strength retention compared to an untreated polybenzazole article or a polybenzazole article containing a dye disclosed by So et al. (Samples 1-5 of Table 1 of Declaration 1).

The amended claims recite *both* functional (allows for a regular reflectance of the article of not more than 30% in not less than 30% of the wavelength region of from 450 nm to 700 nm) *and* structural information (e.g., *m*-phenylenediamine, *p*-phenylenediamine, etc.) for the light-resisting agent. As described above, the fact that a dye absorbs light with a wavelength of 300-600 nm does not mean that the dye inherently has the same functionality of the specific dyes recited in the pending claims. The addition of the light-resisting agents recited in the pending claims (i.e., *m*-phenylenediamine, *p*-phenylenediamine, *o*-aminophenol, 2-amino-4-nitrophenol, 2-aminophenol-4-sulfonamide, and 1,8-diaminonaphthalene) significantly improves the strength retention and light-resistance of polybenzazole articles compared to other conventional dyes that absorb light with a wavelength of 300-600 nm.


Regarding structure, So et al. does not teach nor suggest the structures of the claimed light-resisting agents. In particular, So et al. discloses the use of naphthol, which has a structure that is completely different than any of the light-resisting agents recited in the pending claims.

According to the Examiner, after having read the disclosure of So et al., one of ordinary skill in the art would have been motivated to select naphthol, a dye that absorbs light with a wavelength of 300-600 nm, knowingly alter its structure, and selectively arrive at the light-resisting agents recited in the amended pending claims (i.e., *m*-phenylenediamine, *p*-phenylenediamine, *o*-aminophenol, 2-amino-4-nitrophenol, 2-aminophenol-4-sulfonamide, and 1,8-diaminonaphthalene). However, based on the foregoing discussion, this view is not correct. The data in the present specification and Declarations 1 and 2 demonstrate that a dye that absorbs light with a wavelength of 300-600 nm does not mean that the dye inherently has the same functionality of the specific dyes recited in the pending claims. Moreover, as the Examiner has conceded, So et al. does not teach structural equivalents of the claimed light-resisting agents. Thus, So et al. simply does not provide any teaching or suggestion that explicitly or implicitly would lead one of ordinary skill in the art to arrive at the present invention as defined by the pending claims. In the absence of such a teaching or suggestion, it cannot be properly said that the present invention is obvious in view of So et al. Applicants respectfully request that the obviousness rejection be withdrawn.

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



John Kilyk, Jr., Reg. No. 30,763
LEYDIG, VOIT & MAYER, LTD.
Two Prudential Plaza, Suite 4900
180 North Stetson Avenue
Chicago, Illinois 60601-6780
(312) 616-5600 (telephone)
(312) 616-5700 (facsimile)

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